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APPLICATION FOR LETTERS PATENT  
UNITED STATES OF AMERICA

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United States of America residing at 9315 Spinnaker Lane, Gainesville, Georgia  
20 30506, and Raymond R. Spivey Sr., a citizen of the United States of America residing  
at 475 Ivey Court, Mableton, Georgia 30126, have invented a

**THREE BY FOUR CAN PACKAGE DISPENSING CARTON**

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of which the following is the specification.

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**TITLE OF THE INVENTION****THREE BY FOUR CAN PACKAGE DISPENSING CARTON**

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**BACKGROUND OF THE INVENTION**10 **1. Field of the Invention**

The present invention relates generally to an enclosed paperboard carton capable of enclosing cylindrical containers which has a unique opening and dispensing feature that allows the containers, for example cans, to be removed or dispensed while preserving the overall structural integrity of the carton. This dispenser can be used on a carton containing cans or other types of cylindrical containers arranged in three rows. This dispenser prevents the containers in the first two rows from rolling out when opened, but provides for the easy removal of all containers in the carton, including the containers in the bottom row. The size of the dispenser opening of this invention has been greatly reduced to preserve the structural integrity of the carton during handling and also after the dispenser has been opened. The dispensing feature may also provide a safety net for the first container that is dispensed when the carton is opened.

25 **2. Background**

Fully enclosed cartons capable of carrying cans have been used in the past that have a feature for dispensing the cans one at a time. Dispensers have been provided at various locations on these cartons depending on the design. Many of these dispensers suffer from the disadvantage that once open, they allow all of the containers to roll out. In addition, it is difficult to carry some of these cartons without the containers falling out once the dispenser has been opened. Many of these dispensers do not prevent the containers in the second row from rolling out automatically when the dispenser is opened. Many of these dispensers do not permit easy access to obtain the containers in the bottom row while restraining them from automatically rolling out of the carton.

35 Many of these dispensers destroy the overall carton integrity once they have been opened. Many of the dispensers lack a safety net for the first container dispensed.

SUMMARY OF THE INVENTION

It is an object of this invention to provide a carton with a dispenser that preserves the integrity of the carton after the dispenser has been opened. It is another 5 object of this invention to provide a safety net or basket for any container that is automatically dispensed when the dispenser is opened. It is an object of this invention to develop a carton with a dispenser which has improved machineability in the bottling plant when the various flaps forming the dispenser are folded and glued. It is a further object of this invention to develop a carton with a dispenser that has superior 10 structural integrity while it is being handled during shipping and delivery to a store and handling by the consumer in taking the carton filled with containers home. It is another object of this invention to develop a dispenser that preserves the structural integrity of the carton when the dispenser has been opened. It is the further object to develop a dispenser that is easier to open than past dispensers. It is a still a further 15 object of this invention to develop a dispenser for a carton containing three rows of cans that will prevent the bottom row and middle row from automatically rolling out of the carton when the dispenser is opened, but provide for easy removal of the cans in those rows. It is a still further object of this invention to develop a dispenser that will permit the carton to be moved from one location to another after it has been 20 opened without discharging containers. The final object of this invention is to provide a dispenser that can be easily opened.

Briefly described, in a preferred form, the objects of this invention are achieved by providing an enclosed carton that has a unique dispenser in the exiting 25 end of the carton. This carton is generally rectangular and has a bottom, a top, two sides, a closed end and an exiting end. The carton is foldably constructed from a blank having panels and flaps. The exiting end, or ends, of the carton permits containers to be taken from the carton via the dispenser.

This carton has a dispenser that is formed from a dispenser flap that is attached 30 to the carton by a bottom tear line in the exiting end that is generally parallel to the bottom that extends only partially across the exiting end of the carton, with side tear lines extending from the bottom tear line to form an end retainer in the exiting end of the carton adjacent each side panel. Each side tear line turns into the adjacent side panel and extends diagonally through the side panel and extends into the top panel where the tear lines meet to form a top tear line. The bottom tear line is based at least

a sufficient distance from the bottom panel to restrain the containers in the bottom row from rolling out while the end retainers extend into the exiting end of the carton at least a sufficient distance from each side panel and from the bottom panel to prevent the containers in the middle row from rolling out when the dispenser is 5 opened. The distance from the top tear line to the fold line between the top panel and top end panel is significantly less than the diameter of a container to be contained in the carton. Preferably, in one embodiment of this invention this distance is between 10 70 and 85% of the diameter of a container to be contained in the carton. However, it has been found that the distance can be as short as one half the diameter of a can plus approximately three millimeters. Making this distance as short as possible strengthens the carton both when the dispenser is closed and also when it is open as it greatly reduces the size of the void created when the dispenser is open.

In order to permit easy access of the containers in the carton, the bottom tear line is preferably located at a distance from the bottom panel that is between one-third 15 and two-thirds of the diameter of a container in the bottom row. The ends of this carton are preferable closed by a bottom end flap, two side end flaps and a top end flap that are glued together.

This carton is ideally suited for carrying twelve cans in three rows with four cans in each row, but can be designed to carry more cans or cylindrical containers.

20 By constructing the bottom tear line in the end of the carton as a fold line rather than a tear line, a basket is formed when the dispenser flap is opened to catch the first container that automatically falls out of the carton.

25 Preferably, this carton is constructed with a bottom end flap having a height somewhat less than the diameter of the can in the bottom row with a bottom tear line, being located immediately adjacent to the end of the bottom end flap for ease of tearing off or folding the dispenser flap.

To permit easy opening of this dispenser, a dispenser opening flap is attached by a fold line in the top panel to the dispenser flap to aid in commencing the opening of the dispenser flap. This carton may have a carrying handle in the top panel.

30 In order to provide easy access to the cans in the carton that do not automatically roll out, the end retainers are preferably constructed so that they only extend along a portion on each end of the can in the second row to prevent it from rolling out of the carton, but to permit its easy removal from the carton. The bottom

tear line in the exiting end of the carton is placed close enough to the bottom to permit the easy removal of cans in the bottom row.

In another embodiment, each side tear line that extends from the bottom tear line in the exiting end of the carton can be curved near its top towards the adjacent side panel so that only a small portion of the end retainers prevent the can in the second row from rolling out of the carton. In fact, the end retainers only need extend upwardly a short distance above the can in the bottom row to prevent the can in the second row from automatically rolling out. The end retainers need not extend upwardly more than one eighth or one fourth of the diameter of the can in the second row. Utilizing this feature permits the easy removal of cans from the carton, but prevents them from automatically falling out.

By constructing the bottom line in the end of the carton as a fold line rather than a tear line, a basket is formed when the dispenser flap is opened to catch the first container that automatically falls out of the carton. Preferably, this carton is constructed with a bottom end flap having a height somewhat less than the diameter of the can in the bottom row with a bottom fold line or tear line, depending on which is used, being located immediately adjacent to the end of the bottom end flap for ease of tearing off or folding the dispenser flap. Several different dispenser flap embodiments are disclosed.

This carton can be constructed by gluing, taping, stapling and the like, or by locking. The dispenser of this invention can be put in one end of the carton or in both ends.

These and other objects, features, and advantages of the present invention will become more apparent upon reading the following specification in conjunction with the accompanying drawing figures.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG.1 is a plan view of a blank from which a carton according to this invention is constructed.

FIG. 2 is a perspective end view of the carton loaded with cans showing the tear lines that permit separating the dispenser flap from the rest of the carton.

FIG. 3 is a perspective view of a carton made from the blank of FIG. 1 which has been loaded with cans and the dispenser opened, but leaving the dispenser flap

attached and holding a can that rolled out of the carton when the dispenser flap was opened.

5 FIG. 4 is a perspective view of a carton made from the blank of FIG. 1 and filled with cans and the dispenser flap removed showing the first and second rows of cans held in the carton by a bottom end flap and end retainers on each side of the carton.

FIG. 5 is a plan view of a blank from which a carton according to another embodiment of this invention, with a different dispenser flap, is constructed.

10 FIG. 6 is a perspective end view of the carton made from the blank of FIG. 5 loaded with cans showing the tear lines that permit separating the dispenser flap from the rest of the carton.

FIG. 7 is a perspective view of a carton of FIG. 5 in which the dispenser flap has been removed showing the first and second rows of cans held in the carton by a bottom end flap and end retainers on each side of the dispensing end of the carton.

15 FIG. 8 is a plan view of a blank from which a carton according to another embodiment of this invention is constructed.

FIG. 9 is a perspective view of a carton made from the blank of FIG. 8.

#### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

20 The present invention is intended primarily for use with cans of the types used to contain soft drinks, beer and the like. As illustrated in FIG. 1, the blank 10 is formed from a foldably sheet of material, such as paperboard. The blank 10 has a bottom flap 12 which is connected to side panel 14 by fold line 16, and in turn connected to top panel 18 by fold line 20. Top panel 18 is connected to side panel 22 by fold line 24 and in turn connected to bottom flap 26 by fold line 28. Bottom flap 12 is connected to bottom end flap 30 by fold line 32 and connected to bottom end flap 34 by fold line 36. Side panel 14 is connected to side end flap 38 by fold line 32 and connected to side end flap 40 by fold line 36. Top panel 18 is connected to top end flap 42 by fold line 32 and to top end flap 44 by fold line 36. Side panel 22 is connected to side end flap 46 by fold line 32 and connected to side end flap 48 by fold line 36. Bottom flap 26 is connected to bottom end flap 50 by fold line 32 and to bottom end flap 52 by fold line 36.

This carton is capable of containing cans, or other types of cylindrical containers, in three rows of four cans each. This carton has a slotted handle 54 which

is formed by tear line 56 which may extend into side panels 14 and 22 to dissipate the stress imposed on the handle 54 when a person is carrying the carton loaded with cans. This slotted handle 54 has handle flaps 58 that are foldably attached to top panel 18 by fold lines 60. These handle flaps 58 provide cushioning to a person's hand when carrying the carton. Other types of handles, such as the "racetrack" handle can be used. This carton can be constructed without a handle.

It will be understood by those skilled in the art that the carton embodiments of the present invention are generally symmetrical about a horizontal line of bisection, as viewed when FIG. 1 is rotated lengthwise. This symmetry aids in the efficient 10 production of the blank shown in FIG. 1.

The blank illustrated in FIG. 1 is provided with a tear line 62 for forming a dispenser for dispensing cans from the carton formed from the blank of FIG. 1 and loaded with cans as illustrated in FIG. 2. This tear line 62 extends through top panel 18, side panels 14 and 22 and side end flaps 38 and 46. Tear line 62 is connected to 15 bottom tear line 68 which extends partially across side end flap 38 and side end flap 46. Tear line 62 extends from tear line 68 in side end flap 38 to side panel 14 to form end retainer 64. Tear line 62 extends diagonally through side panel 14 and into top panel 18 and extends across top panel 18 parallel to fold line 32 in the top panel. In an identical fashion, tear line 68 extends partially across side end flap 46. Tear line 20 62 extends from tear line 68 in side end flap 46 to form end retainer 66. Tear line 62 extends diagonally across side panel 22 and turns when it enters top panel 18 to be parallel to fold line 32. Preferably, tear line 62 and tear line 68 are formed as a continuous tear line, thus forming dispenser flap 70.

This dispenser flap 70 may have a dispenser opening flap 72 which can be 25 severed from top panel 18 by tear line 74. This dispenser opening flap 72 is attached by fold lines 76 and 78 to dispenser flap 70.

This blank 10 is formed into a carton sleeve by gluing bottom flap 12 to bottom flap 26. Cans can be loaded into this carton sleeve in a bottling plant. This blank 10 when formed into a sleeve is capable of holding three rows of cans with four 30 cans in each row. The cans rest on their sides on bottom flaps 12 and 26. After the cans have been loaded into the carton sleeve on their sides, the various end flaps on both ends are closed. Using the dispensing end 80 of the carton as an example, top end flap 42 is folded downwardly and bottom end flaps 30 and 50 are folded upwardly and side end flaps 38 and 46 are folded sideways and glued to top end flap

42 and bottom end flaps 30 and 50 to form the dispensing end 80 of the carton. The other end of the carton can be closed in the same manner.

When the carton sleeve has been filled with cans and the end flaps folded and glued, the resulting carton has a closed end and a dispensing end 80. However, a dispenser can be placed on both ends of the carton. The cans exit the carton through the dispensing end 80 of the carton. The carton formed from the blanks of FIG. 1 that has been loaded with cans and with the ends closed is illustrated in FIG. 2.

The dispenser flap 70 may be opened by a person inserting his or her fingers into dispenser opening flap 72 and pulling the dispenser flap 70 open, which results in tearing along tear line 62. Bottom tear line 68 in side end flaps 38 and 46 can be torn and the dispenser flap 70 removed from the carton as illustrated in FIG. 4. The cans C are then ready for removal through the dispenser formed by the removal of dispenser flap 70. The can in the top row (e.g. C3) as shown in FIG. 4 is not restrained from being removed.

In place of providing bottom tear line 68 in side end flaps 38 and 46, line 68 can be constructed as a fold line in which case the dispenser flap 70 remains attached to the carton. The dispenser flap 70 serves as a safety net or basket to prevent top can TC from the top row from leaving the vicinity of the carton as illustrated in FIG. 3. This dispenser flap 70 forms a basket with the torn off portion of top panel 18 forming an end wall and the diagonal portions of side panels 14 and 22 forming side walls and the torn open portions of side end flaps 38 and 46 forming a bottom wall of the basket. When the dispenser flap 70 is opened and line 68 is a fold line the can in the top row or cans falls into the basket or safety net as illustrated by can TC in FIG. 3. If the dispenser flap 70 is left attached to the carton, it can be reclosed if desired.

In order to maintain the structural integrity of this carton, bottom end flaps 30 and 50 are not removed whether bottom tear line 68 is a tear line or fold line. Bottom portions 82 of side end flaps 38 and 46 are also not removed as these portions have been glued to bottom end flaps 30 and 50.

The dispenser of this carton is designed to permit the easy removal of cans but prevent those in the first and second row from automatically rolling out when the dispenser flap 70 is opened. It will be realized that the can TC that was in the top row will automatically roll out when the dispenser is opened as shown in FIG. 3. None of the other cans in the carton will automatically roll out when the dispenser flap is opened. The bottom tear line or fold line 68 needs to have a height BH from the

bottom of the carton which is at least sufficient to restrain the cans in the bottom row from rolling out when the dispenser flap 70 is opened. This bottom tear line or fold line 68 is generally parallel to the bottom of the carton. This bottom tear line or fold line 68 is preferably a distance from the bottom that is between one-third and two-thirds of the diameter of a can in the bottom row.

It will be noticed from FIGs. 1-4 that the bottom tear line or fold line 68 is placed no further from the bottom of the carton than necessary to prevent the cans in the bottom row from rolling out. Placing the bottom tear line or fold line 68 at the minimum distance BH from the bottom permits easy access to remove cans from the bottom row of the carton by reaching in through the dispenser and removing the cans.

The second row of cans as illustrated by C2 in FIGs. 3 and 4 are restrained from automatically rolling out of the carton by end retainers 64 and 66 which are formed by not extending bottom tear or fold line 68 all the way across the dispensing end 80 of the carton. Tear line 62 extends upwardly from bottom tear or fold line 68 and form end retainers 64 and 66. These end retainers 64 and 66 extend into the dispensing end 80 of the carton at least a sufficient distance from side panels 14 and 22 and at least at a sufficient height EH from the bottom to prevent the cans (C2) in the second row from rolling out of the carton when the dispenser is opened while the bottom of the carton is in a horizontal plane.

It should be realized that bottom fold line or tear line 68 can be spaced from the bottom of the carton at a distance BH greater than the minimum height necessary to restrain cans in the bottom row from automatically rolling out of the carton when the dispenser is open. Likewise, end retainers 64 and 68 can have a greater width W and height EH than the minimum required to prevent cans in the second row from automatically rolling out when the dispenser is open. Preferably tear line 62 is curved near its top in the dispensing end of the carton towards the side panels 14 and 22 so that only a small portion of end retainers 64 and 66 prevent the can C2 from rolling out of the carton as illustrated in FIGs. 3 and 4. The end retainers 64 and 66 only need to extend upwardly a short distance above the can in the bottom row as illustrated in FIGs. 3 and 4 to prevent the can C2 in the second row from automatically rolling out. In fact, end retainers 64 and 66 need not extend upwardly from the bottom panel more than from one eighth to one fourth of the diameter of the can C2 in the second row. Making the distances BH and EH as short as possible but yet capable of holding the cans in the first and second rows in the carton, permits the

easy removal of the cans in the bottom of the carton. The width W of the end retainer 64 and 66 as shown in FIGs. 2, 3 and 4 between tear line 62 and fold line 32 should also be made as short as possible but yet hold the container C2 in the second row. This also facilitates a person reaching in through the dispenser and removing a can 5 from the bottom of the carton.

In order to maintain the structural integrity of the carton of this embodiment of the invention it is preferred that the height BH be approximately the same or slightly more than the distance from fold line 32 to end 84 of bottom end flap 30 and that this same distance be maintained in respect to bottom end flap 50.

10 It should be realized that a can C2 in the second row as illustrated in FIG. 4 can be easily removed by twisting the can C2 slightly along its longitudinal axis and removing the can.

15 Cartons with three or more rows of cans can utilize the dispenser of this embodiment of the invention. The carton of this embodiment with its dispenser feature can also be used with cartons containing two rows of cans with a plurality of cans in each row.

20 Another embodiment of this invention is illustrated in FIG. 5. A blank 110 for this embodiment is formed from a foldably sheet of material, such as paperboard. The blank 110 has a bottom flap 112 which is connected to side panel 114 by fold line 116, and in turn connected to top panel 118 by fold line 120. Top panel 118 is connected to side panel 122 by fold line 124 and in turn connected to bottom flap 126 by fold line 128. Bottom flap 112 is connected to bottom end flap 130 by fold line 132 and connected to bottom end flap 134 by fold line 136. Side panel 114 is connected to side end flap 138 by fold line 132 and connected to side end flap 140 by fold line 136. Top panel 118 is connected to top end flap 142 by fold line 132 and to top end flap 144 by fold line 136. Side panel 122 is connected to side end flap 146 by fold line 132 and connected to side end flap 148 by fold line 136. Bottom flap 126 is connected to bottom end flap 150 by fold line 132 and to bottom end flap 152 by fold line 136.

30 This carton is capable of containing cans, or other types of cylindrical containers, in three rows of four cans each. This carton may have a slotted handle 154 which is formed by tear line 156 which may extend into side panels 114 and 122 to dissipate the stress imposed on the handle 154 when a person is carrying the carton loaded with cans. This slotted handle 154 has handle flaps 158 that are foldably

attached to top panel 118 by fold lines 160. These handle flaps 158 provide cushioning to a person's hand when carrying the carton. Other types of handles, such as the "racetrack" handle, and can be used with the cartons of this invention. This carton can be constructed without a handle.

5        The blank illustrated in FIG. 5 is provided with a tear line 162 for forming the dispenser of this embodiment for dispensing cans from the carton formed from the blank of FIG. 5 and loaded with cans as illustrated in FIG. 6. This tear line 162 extends through top panel 118, side panels 114 and 122 and side end flaps 138 and 146. Tear line 162 is connected to both ends of bottom tear line 168 which extends 10 partially across side end flap 138 and side end flap 146. Tear line 162 extends upwardly from tear line 168 in side end flap 138 and turns at an angle to side panel 114 to form end retainer 164. Tear line 162 extends diagonally through side panel 114 and into top panel 118 at a diagonal angle as tear line 162A until it reaches tear 15 lines 174 where it turns again so that tear line 174 is parallel to fold line 132 in top panel 118. Tear line 168 extends partially across side end flap 146 in an identical fashion. Tear line 162 extends upwardly from tear line 168 in side end flap 146 and turns at an angle to side panel 122 to form end retainer 166. Tear line 162 extends diagonally across side panel 122 and into top panel 118 and continues the diagonal direction as tear line 162A until it reaches tear line 174 in top panel 118. Preferably, 20 tear line 162 and tear line 168 are formed as a continuous tear line, thus forming dispenser flap 170.

25        This dispenser flap 170 may have a dispenser opening flap 172 which can be severed from top panel 118 by tear line 174, which with this embodiment is co-extensive with tear line 162 along the dispenser opening flap 172. This dispenser opening flap 172 has a score line 178 which may have cuts in it to make it easier to fold when the dispenser flap 170 is being opened. This dispenser opening flap 172 is attached to dispenser flap 170 by fold line 176 which may have nicks to facilitate folding when the dispenser flap 170 is being opened.

30        This blank 110 of this embodiment is formed into a carton sleeve by gluing bottom flap 112 to bottom flap 126. Cans can be loaded into this carton sleeve in a bottling plant. This blank 110 when formed into a sleeve is capable of holding three rows of cans with four cans in each row. The cans rest on their sides on bottom flaps 112 and 126. After the cans have been loaded into the carton sleeve on their sides, the various end flaps on both ends are closed. Using the dispensing end 180 of the carton

as an example, top end flap 142 is folded downwardly and bottom end flaps 130 and 150 are folded upwardly and side end flaps 138 and 146 are folded sideways and glued to top end flap 142 and bottom end flaps 130 and 150 to form the dispensing end 180 of the carton. The closed end 181 of the carton can be closed in the same manner.

When the carton sleeve has been filled with cans and the end flaps folded and glued, the resulting carton has a closed end 181 and a dispensing end 180. However, a dispenser can be placed on both ends of the carton. The cans exit the carton through the dispensing end 180 of the carton. The carton formed from the blank of FIG. 5 that has been loaded with cans and with the ends closed is illustrated in FIG. 6.

Referring to FIG. 6, the dispenser flap 170 may be opened by a person inserting his or her fingers into dispenser opening flap 172 and pulling the dispenser flap 170 open, which results in tearing along tear lines 162, 162A and 174. Bottom tear line 168 in side end flaps 138 and 146 can be torn and the dispenser flap 170 removed from the carton as illustrated in FIG. 7. The cans C are then ready for removal through the dispenser 184 formed by the removal of dispenser flap 170.

In order to maintain the structural integrity of this carton, bottom end flaps 130 and 150 are not removed as tear line 168 does not extend through bottom end flaps 130 and 150. Bottom portions 182 of side end flaps 138 and 146 are also not removed as these portions are glued to bottom end flaps 130 and 150 as shown in FIG. 7.

The dispenser 184 of this carton is designed to permit the easy removal of cans but prevent those in the first C1 and second row C2 from automatically rolling out when the dispenser flap 170 is opened. The bottom tear line 168 needs to have a height BH from the bottom of the carton which is at least sufficient to restrain the cans in the bottom row from rolling out when the dispenser flap 170 is opened. The bottom tear line 168 is preferably placed generally parallel to the bottom of the carton. Preferably this bottom tear line 168 should be at a distance from the bottom of the carton that is between one-third and two-thirds of the diameter D of a can C1 in the bottom row.

Placing the bottom tear line 168 at the minimum distance BH from the bottom permits easy access to remove cans from the bottom row of the carton, as illustrated by C1 in FIG. 7, by reaching in through the dispenser 184 and removing the cans.

The middle row of cans, as illustrated by C2 in FIG. 7, are restrained from rolling out of the carton by end retainers 164 and 166 which are formed by not

extending bottom tear line 168 all the way across the dispensing end 180 of the carton. Tear line 162 extends upwardly from each end of bottom tear line 168 and forms end retainers 164 and 166. These end retainers 164 and 166 extend into the dispensing end 180 of the carton at least a sufficient distance W from side panels 114 and 122 and at least at a sufficient height EH from the bottom of the carton to prevent the cans (C2) in the middle row from rolling out of the open dispenser while the bottom of the carton is in a horizontal plane. Preferably the width W of end retainers 164 and 166 as shown in FIG s. 6 and 7 should be between one eighth and one fourth of the height of the can C to be contained in the carton. Reducing the width W to the minimum required to retain a can C2 in the middle row in the carton facilitates a person reaching in through the dispenser 184 and removing a can C1 or C2.

As illustrated in FIG. 7, bottom tear line 168 can be spaced from the bottom of the carton at a distance BH greater than the minimum height necessary to restrain cans C1 in the bottom row from automatically rolling out of the open dispenser 184. Likewise, end retainers 164 and 166 can have a greater width W and height EH than the minimum required to prevent cans C2 in the second row from rolling out of the open dispenser 184. Preferably, tear line 162 turns at an angle in its location adjacent a side panel 114 or 122 in its upper portion in the dispensing end 180 of the carton towards the adjacent side panel 114 and 122 so that only a small portion of end retainers 164 and 166 prevent the can C2 from rolling out of the carton as illustrated in FIG. 7. The end retainers 164 and 166 only need to extend upwardly a short distance above the can C1 in the bottom row as illustrated in FIG. 7 to prevent the can C2 in the second row from rolling out. In fact, end retainers 164 and 166 need not extend upwardly from the bottom panel more than one-eighth or one-fourth of the diameter of the can C2 in the second row. Making the distances BH and EH as short as possible but yet hold the cans in the first and second rows in the carton, permits the easy removal of the cans in the bottom of the carton.

In order to maintain the structural integrity of the carton it is preferred that the height BH be approximately the same or slightly more than the distance from fold line 132 to end 184 (FIG. 5) of bottom end flap 130 and to end 186 of bottom end flap 150.

It has been found that the structural integrity of a carton with a dispenser of this type can be greatly increased by reducing the distance T between where the tear line 162 crosses fold line 120 and fold line 132 in top panel 118. This distance T is

directly related to the diameter D of the containers C. It had been thought in the past that this distance T must to be equal to or greater than the diameter D of a container C. It has been found that the structural integrity of the carton both with the dispenser flap 170 attached and with an open dispenser 184 is greatly increased when this 5 distance T is greatly reduced. It has been found that this distance T can be as short as one half of the diameter of a container, such as a can, plus approximately three millimeters. This formula is valid for cans such as twelve ounce cans that have a diameter D of approximately 66 millimeters. Thus, the distance T in a carton carrying these twelve ounce cans could be as short as 36 millimeters. It is preferred that this 10 distance be between 70 and 85% of the diameter of a container. In the case of the twelve ounce can, a distance of 53 millimeters is preferred. This formula that T can be as short as one half the diameter of a container, such as a can, plus approximately three millimeters applies to other can sizes within the standard range of sizes of beverage cans packaged in cartons. This formula has been tested and determined to 15 be applicable to cans of smaller and greater diameters. Greatly reducing the distance T improves the ability to fold the various flaps on the dispensing end 180 of the carton. This is important because these flaps are folded and glued at high speed in a packaging machine.

Greatly reducing the distance T obviously results in the carton having a 20 smaller dispenser flap 170. Reducing the size of the dispenser flap 170 reduces the likelihood of the tear lines 162 and 168 being torn during shipping and handling by a consumer.

When the dispenser 184 is open on a carton where the distance T has been 25 greatly reduced, the void of the dispenser 184 in the carton is greatly reduced, which means that more structure of the carton remains which enhances the structural integrity of the carton after the dispenser flap 170 has been removed. The distance T between the dispensing end 180 of the carton is measured from fold line 132 to where tear line 162 intersects fold line 120. The distance T on side panel 122 between the intersection of tear line 162 and fold line 124 and the dispenser end 180 is the same as 30 it is in side panel 114 as described.

This dispenser flap 170 is easy to open because top tear line 174, which is an extension of tear line 162A, provides easy access for a person's fingers to be inserted. It has been found that providing cuts in score line 178 and nicks in fold line 176 makes it easy to use a dispenser opening flap 172 to open the dispenser flap 170. The

actual pulling open of the dispenser flap 170 along fold line 176 enables the dispenser flap 170 to be easily pulled opened even though distance T is short.

It should be realized that a can C2 in the second row as illustrated in FIG. 7 can be easily removed by twisting the can C2 slightly along its longitudinal axis and  
5 removing the can.

Although not shown for this embodiment, dispenser flap 170 can be opened, but left attached to the carton by making cut line 168 a fold line. As illustrated by the embodiment shown in FIG. 3, the dispensing flap 170 shown in FIG. 6 forms basket into which can C3 in the top row as shown in FIG. 7 falls when the dispenser flap is  
10 opened.

FIG. 8 illustrates another embodiment of this invention. FIG. 8 is a plan view of a blank which is identical to the blank shown in FIG. 5 except for having a different dispenser opening flap. This blank 210 can be formed in a carton in the same manner as the blank illustrated in FIG. 5 with which it shares the same  
15 numbering except for the dispenser opening, the dispenser opening flap, and tear line for the dispenser flap. The blank 210 illustrated in FIG. 8 has a different type of dispenser opening flap 211 than the dispenser opening flap 172 illustrated in FIG. 5. The tear line 212 shown in FIG. 4 is similar to tear line 162 illustrated in FIG. 5 except in the top panel 118. The dispenser opening flap 170 illustrated in FIG. 8 has a  
20 tear line 212. This tear line 212 meets nicked cut line 216 in dispenser opening flap 211 in top panel 118 near side panel 114 and on the other side of top panel 118 near side panel 122. This dispenser opening flap 211 has a curved score line 214 that extends across top panel 118 and meets tear line 212 at the side of top panel 118 near side panel 114, and on the other side of the top panel 118 near side panel 122.  
25 Cushioning flap 219 is formed between curved score line 214 and nicked cut line 216. Triangular score line 218 may be formed in top panel 118 as an extension to tear line 212 from side panel 114 and correspondingly from side panel 122. Triangular score line 218 preferably meets curved score line 214 where the latter meets tear line 212 near side panel 114 and also near side panel 122. A small longitudinal cut line 220  
30 may be formed to facilitate the entry of a person's fingers into dispenser opening flap 211 to tear open the dispenser flap 170.

As described supra in respect to the embodiment illustrated in FIGs. 5-7 the distance T' from fold line 132 to nicked cut line 216 at fold line 120 in top panel 118 can be as short as one half the diameter of a can plus approximately three millimeters.

Preferably this distance is between 70 and 85% of a diameter of a container to be contained in the carton. Thus, T' can be basically the same distance as T in FIGs. 5-7. This short distance T' is made possible by the features of the carton described above in connection with FIGs. 5-7.

5 The construction of the dispenser opening flap 211 facilitates reducing the distance T'. This dispenser opening flap 211 is engaged by a person inserting his or her fingers between triangular score line 218 and nicked cut line 216 with the fingers folding cushioning flap 219 and engaging curved score line 214 which is pulled forward opening the dispenser flap 170.

10 As in the case of the carton illustrated in FIGs. 5-7, bottom tear line 168 can be constructed as a fold line which will allow dispenser flap 170 to be utilized as a basket or safety net for catching cans dispensed from the carton.

15 The dispenser of this embodiment of the invention provides an easy opening feature in that it has a dispenser opening flap where a person's fingers can be inserted to open the dispenser flap.

All of the dispenser embodiments of this invention can be used with cartons containing two rows of cans with a plurality of cans in each row. Cartons with three or more rows of cans can also utilize the dispensers of this invention.

20 While the invention has been disclosed in its preferred forms, it will be apparent to those skilled in the art that many modifications, additions, and deletions can be made therein without departing from the spirit and scope of the invention and its equivalents as set forth in the following claims.